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Printed Pages : 4 **CE – 602**

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0027 Roll No. | | | | | | | | | | |

B. Tech.

(SEM. VI) EXAMINATION, 2006-07

CONCRETE STRUCTURE - II

Time : 3 Hours] *[Total Marks : 100*

Note : *(1) Attempt **all** questions.*
(2) Use of IS : 456 is allowed.
(3) Any data not given may be assumed suitably.

1. Attempt any **two** parts of the following : **10×2=20**

(a) Compute the design moments of an interior panel of a flat slab of size 7 m x 5m. It is subjected to line load of 4.5 kN/m^2 and floor finish of 1 kN/m^2.

(b) Design a circular roof slab of 4.2 m inside diameter fixed with edge beam of 230 mm wide. It has to carry a line load of 4 kN/m^2. Use m-20 concrete and mild steel.

(c) What are various components of flat slab? Also discuss the deflection of flat slab.

2. Attempt any **two** parts of the following : **10×2 = 20**

(a) A rectangular cross section of a curved beam is 300 mm x 500 mm. It is subjected to factored bending moment of 70 kN-M, factored torsional moment of 50 kN-M and factored shear force of 70 kN. Using M-20 grade concrete and fe-415 grade steel determine the reinforcement for beam.

(b) A brick wall 300 mm thick carries a load of 170 kN/M length. Design a RCC footing, if the safe bearing capacity of soil is 100 kN/M^2. Use M-20 concrete and Fe-250 steel.

(c) Derive an expression for bending moment at any section of a semi circular beam which is supported on three equally spaced columns.

3. Attempt any **two** parts of the following : **10×2=20**

(a) What are various elements of Intze water tank? Discuss the utility of braces in it.

(b) Design long wall of an under ground water tank 4 m x 10m x 3m deep. The soil consists of saturated unit weight of 17 kN/M^3 and angle of repose of 30^o. The water table is likely to rise upto ground level. Use M-20 concrete and HYSD bars.

(c) Design a cylindrical tank with flexible base for 200 KL. The depth of water is to be 2.8 m including a free board of 200 mm.

4. Design a cantilever retaining wall to retain earth embankment 2.2 m high above ground level. Its density is 16 kN/M^3 and angle of repose 25^o. The earth is horizontal at top. The safe bearing capacity of soil is 105 kN/M^2 and co-efficient of friction between soil and concrete is 0.5. **20×1=20**

OR

4. Design a culvert of span 5.5 m over a drain for single lane and class B IRC loading. 65 mm thick wearing coat has to be provided over it, IRC loading has been given on the last page.

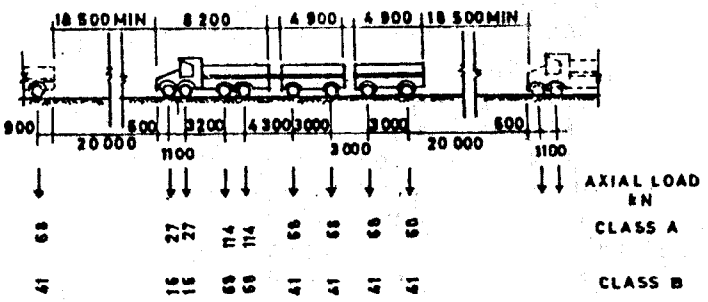
5. A prestressed concrete I-Beam has its upper flange 750 mm wide and 200 mm deep, lower flange 400 mm wide and 300 mm deep and a web of depth 500 and width 150 mm. It is supported over a span of 30 m and carries a u.d.l of 4 kN/M, exclusive of self weight. It is prestressed with 120 wires of 5 mm diameter, with their centroid 100 mm above the bottom edge and initially tensioned to 1000 N/mm^2. Assuming 15% losses in prestress determine **20×1=20**

the extreme fibre stresses at mid span (i) due to initial prestress and dead load (ii) due to final prestress, dead load and line load.

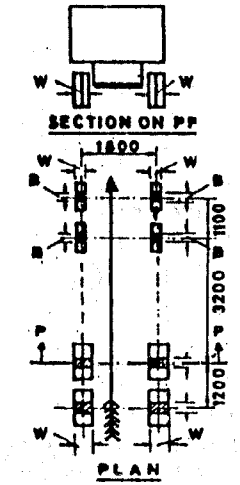
OR

5. Describe various losses of prestress and their computation.

Standard Specifications for Road Bridges



CLASS A AND B TRAIN OF VEHICLES



AXLE LOAD kN	CONTACT WIDTH B mm	CONTACT WIDTH W mm
114	250	500
68	200	380
41	150	300
27	150	200
16	125	175

DRIVING VEHICLES

CLEARANCES

CARRIAGE WAY WIDTH m	f m	g m
5.5 to 7.5	0.15	0.4 to 1.2
Over 7.5	0.15	1.2

I.R.C. Class A and B loadings

width of slab over which road is effective.

$$e = k \times \left(1 - \frac{x}{\ell}\right) + W$$

where e = the effective width of slab on which the load acts

ℓ = the effective span in the case of simply supported slabs and equal to the clear span in the case of continuous slabs.

x = the distance of the centre of gravity of the concentrated load from the near support.

W = the breadth of the concentration area of the load, i.e., the dimensions of the tyre or track contact area over the road surface of the slab in a direction at right angles to the span plus twice the thickness of the wearing coat or surface finish above the structural slab.

k = a constant having values as shown in Table A.1 depending on the ratio ℓ'/ℓ, where l' is the width of the slab.

Table A.1 Values of k in Equation (A.1)

$\frac{\ell}{l'}$	k for simply supported slab	k for continuous slab	$\frac{l'}{l'}$	k for simply supported slab	k for continuous slab
0.1	0.40	0.40	1.1	2.60	2.28
0.2	0.80	0.80	1.2	2.64	2.36
0.3	1.16	1.16	1.3	2.72	2.40
0.4	1.48	1.44	1.4	2.80	2.48
0.5	1.72	1.68	1.5	2.84	2.48
0.6	1.96	1.84	1.6	2.88	2.52
0.7	2.12	1.96	1.7	2.92	2.56
0.8	2.24	2.08	1.8	2.96	2.60
0.9	2.36	2.16	1.9	3.00	2.60
1.0	2.48	2.24	2.0 and above	3.00	2.60